

REMARKS

In the outstanding Official Action, the Examiner rejected claims 36-39 under 35 U.S.C. § 103 as unpatentable over SHAPIRA (U.S. Patent No. 6,697,641) in view of DEAN (U.S. Patent No. 6,091,970). The Examiner indicated claims 40 and 41 to be allowed.

Applicants note the Examiner's indication of allowability with obvious appreciation. However, Applicants respectfully traverse the Examiner's rejection of claims 36-39 and submit that these claims are also allowable for reasons as will be set forth hereinbelow.

In view of the herein contained remarks, Applicants respectfully request reconsideration and withdrawal of the outstanding rejection together with an indication of the allowability of all the claims pending in the present application. Such action is respectfully requested and is now believed to be appropriate and proper.

Applicants invention is directed to a radio transmission apparatus. In particular, Applicants invention is directed to a radio transmission apparatus comprising an antenna having first and second linear polarization antenna elements that extend perpendicular to each other. Applicants invention further comprises a phase controller that multiplies transmission signals for one of the first linear polarization antenna elements or the second linear polarization antenna element by a reference signal to invert a polarity of the transmission signal corresponding to the reference signal.

It is respectfully submitted that the combination of features recited in, e.g., Applicants claim 36, is taught by neither SHAPIRA or DEAN, nor by any proper combination of the teachings of SHAPIRA and DEAN. Accordingly, Applicants submit

that the Examiner's rejection is inappropriate and respectfully request reconsideration thereof together with an indication of the allowability of claims 36-39.

Initially, Applicants wish to note that the above-noted combination of features defining Applicants invention provides significant advantages. In particular, as a result of the above-noted combination of features, a variation in the received electric field strength that is caused by mismatch of the reception antenna with the receiving polarization plane is generated. Accordingly, the present invention enables accurately receiving signals with a single antenna using information regarding the variation of the received electric field strength.

These advantages, which flow from the above-noted combination of features, are not taught, disclosed nor rendered obvious by any proper combination of SHAPIRA and DEAN. In particular, neither SHAPIRA nor DEAN nor any proper combination of SHAPIRA and DEAN disclose, teach or suggest a phase controller as recited in Applicants claim that multiplies a transmission signal for one of the first linear polarization antenna element or the second linear polarization antenna element by a reference signal to invert a polarity of the transmission signal corresponding to the reference signal, in the claimed combination.

SHAPIRA relates to a method and system for improving communication by enhancing performance of a base station transceiver by detecting a signal received from a mobile transceiver by at least two antennas, thus producing a plurality of received signal portions. The method involves determining the polarization of a signal transmitted to the mobile transceiver according to the detected polarization characteristics, reassembling the received signal from the received signal portions

according to the detected polarization characteristics and alternatively, dithering the polarization of the transmitted signal.

In particular, SHAPIRA teaches that the horizontal antenna 117 (Fig. 10) transmits the signal in one polarization state and the vertical antenna 118 transmits the signal in another polarization state with the two polarization states being orthogonal to one another. The combined signal from both antennas has a final single polarization which is derived from a weighted combination of the two signals (column 13, lines 46-49). According to the teachings of SHAPIRA, the final polarization vector can be controlled by controlling each of the transmitted signals, either by control of the amplitude, the phase or both. In particular, as disclosed in the paragraph starting at column 13, line 52, the phase shifter 14 controls the phase between the signals by shifting the phase of the signal provided to one antenna with respect to the signal provided to the other antenna. As seen in Fig. 10, the phase shifter 114 controls the phase of the signal provided to the horizontal antenna 117.

Accordingly, it is clear that the phase shifter of SHAPIRA does not multiply the transmission signals for one of the first linear polarization antenna element or the second linear polarization element by a reference signal to invert a polarity of the transmission signal corresponding to the reference signal. Rather, the phase shifter 114 of SHAPIRA controls the phase between the antenna signals themselves. This is clearly different than that recited in Applicants claim 36.

In setting forth the rejection, the Examiner asserted that the phase controller of the present invention is disclosed by SHAPIRA in Figs. 5, 7 and 11 and column 9, lines 36-67, column 11, line 60 through column 12, line 65, and column 13, lines 21-49.

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However, none of the above-noted portions of SHAPIRA in any way relate to a reference signal that is multiplied together with a signal for one of the first and second linear polarization antenna elements.

The Examiner relies upon DEAN to overcome the admitted shortcomings of SHAPIRA. However, Applicants submit that the disclosure of DEAN is inadequate and insufficient to supply the deficiencies of SHAPIRA. In this regard, Applicants note that DEAN relates to a pseudo-omnidirectional base station arrangement. In particular, the phase shifters 122, 124 of DEAN apply a random phase adjustment to signals Q2, Q3 in order to effectively time average out nulls in the interference pattern that is created when multiple antennas are connected together. In this regard, the Examiner's attention is respectfully directed to column 5, lines 13-18 of DEAN. Thus, DEAN is clearly inadequate and insufficient to supply the previously noted shortcomings of SHAPIRA.

In this regard, while SHAPIRA teaches controlling phase of signals transmitted from two perpendicularly oriented polarization antennas, neither SHAPIRA nor DEAN teach or suggest a phase controller as recited in Applicants claim 36 which multiplies a transmission signal provided to one of the perpendicular polarization antenna elements by a reference signal in order to invert the polarity of the transmission signal in accordance with the reference signal.

The present invention intentionally generates variations in a received electric field strength caused by mismatching of a received polarization plane when a reception apparatus with a single antenna receives signals transmitted from a transmission apparatus with two antennas with different polarization planes. In view of the above-

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noted shortcomings of SHAPIRA and DEAN, it is apparent that no proper combination of these two references disclose the combination of features recited in Applicants claim.

Moreover, there is no proper motivation for modifying the features of SHAPIRA with the teachings of DEAN. The motivation asserted by the Examiner is merely the generic goal of all wireless communication antenna systems to enhance the performance for efficient signal adaptability. It does not relate to specifically modifying the features of SHAPIRA in view of the disclosure of DEAN. Accordingly, the Examiner has set forth no proper motivation for the proposed combination.

As noted above, the Examiner has set forth reasons for the indication of allowable subject matter. In this regard, while Applicants do not disagree with the features enumerated by the Examiner, Applicants further point out that each of the claims in the present application sets forth a particular combination of features and that the patentability of each claim is also based on a particular totality of the features recited therein. Accordingly, the reasons for allowance should not be necessarily limited to those features enumerated by the Examiner.

Applicants note that the status of the present application is after Final Rejection and that an application may not be amended once a Final Rejection has issued. Nevertheless, because Applicants have not amended the claims but have merely traversed the Examiner's rejection, it is respectfully submitted that entry of the present amendment is appropriate and proper. Additionally, Applicants arguments have provided a clear evidentiary basis supporting the patentability of the pending but still rejected claims and thus are further appropriate for entry. Accordingly, reconsideration

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of the outstanding rejection and an indication of the allowability of all the claims pending in the present application is respectfully requested in due course.


SUMMARY AND CONCLUSION

Applicants have made a sincere effort to place the present application in condition for allowance and believe that they have now done so. Applicants have not amended the claims but have traversed the Examiner's rejection and pointed out the shortcomings and deficiencies thereof. In this regard, Applicants have discussed the features of Applicants invention and have contrasted the same with the disclosures of the references, individually as well as in any proper combination. Applicants have pointed out the serious and substantial shortcomings of the references with respect to the features of Applicants claims. Accordingly, Applicants have provided a clear evidentiary basis supporting the patentability of all the claims in the present application and respectfully request an indication to such effect in due course.

Should an extension of time be necessary to maintain the pendency of this application, including any extensions of time required to place the application in condition for allowance by an Examiner's Amendment, the Commissioner is hereby authorized to charge any additional fee to Deposit Account No. 19-0089.

Should the Examiner have any questions or comments regarding this Response, or the present application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
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